REMARKS

Claims 1-14 and 21-26 were previously pending. Claims 10-14, 24 and 25 are considered to be allowable subject matter, i.e., would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim. Claims 1, 10 and 24 have been amended. Claim 26 has been cancelled without prejudice or disclaimer. Claim 27 has been added. Following entry of this amendment, claims 1-14, 21-25 and 27 will be pending.

I. REJECTION OF CLAIMS UNDER 35 USC §103(a)

Claims 1, 4, 23 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,600,168 issued to Lee ("Lee") in view of U.S. Patent No. 5,567,966 issued to Hwang ("Hwang"). Claims 2, 3, 4 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,600,168 issued to Lee ("Lee") in view of U.S. Patent No. 5,567,966 issued to Hwang ("Hwang") as applied to claim 1 and further in view of U.S. Patent No. 6,097,070 issued to Mandelman et al. ("Mandelman"). Claims 5 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable U.S. Patent No. 5,600,168 issued to Lee ("Lee") in view of of U.S. Patent No. 5,567,966 issued to Hwang ("Hwang") as applied to claim 1. Claims 6 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable U.S. Patent No. 5,600,168 issued to Lee ("Lee") in view of U.S. Patent No. 6,043,545 issued to Tseng ("Tseng"). Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable U.S. Patent No. 5,600,168 issued to Lee ("Lee") in view of U.S. Patent No. 5,567,966 issued to Hwang ("Hwang") as applied to claim 1 and further in view of U.S. Patent No. 6,218,276 issued to Liu et al. ("Liu"). Claim 22 is rejected under 35 U.S.C. § 103(a) as being unpatentable U.S. Patent No. 5,600,168 issued to Lee ("Lee") in view of U.S. Patent No. 5,567,966 issued to Hwang ("Hwang") as applied to claim 4 and further in view of U.S. Patent No. 5,625,217 issued to Chau et al. ("Chau"). Withdrawal of the rejections is respectfully requested for at least the following reasons.

Claim 1 as amended includes, inter alia, the feature "a dielectric layer separating the first gate and the SOI substrate, the dielectric layer having a relative **permittivity greater than SiO_2**..."

(emphasis added). Further, as illustrated in FIG. 1 of the present specification and reproduced below for the Examiner's convenience, amended claim 1 claims a straddled gate device 10 formed on a semiconductor-on-insulator (SOI) substrate 40 having active regions 18 defined by isolation regions 16 and an insulator layer 14. The straddled gate device 10 comprises a first gate 36 defining a first channel region interposed between a source and a drain formed within the active region of the SOI substrate; a second gate 50 straddling the first gate defining second channel regions interposed between the first channel region and the source and the drain; a contact connecting 82 the first gate with the second gate. Additionally the straddled gate device 10 includes a dielectric layer 32 separating the first gate and the SOI substrate, the dielectric layer having a relative **permittivity greater than SiO_2** (emphasis added) (see, for example, amended claim 1; page 4, line 15 to page 5, line10 and FIG. 1).

Permittivity, ϵ, of a material reflects the ability of the material to be polarized by an electric field. The permittivity of a material is typically described as its permittivity normalized to the permittivity of vacuum, $\epsilon 0$. Hence, the relative permittivity, referred to as a dielectric constant, of a material is defined as:

$$K=/\epsilon 0$$

While silicon-dioxide (SiO2) (sometimes simply referred to as "oxide") has a dielectric constant of approximately 3.9, other materials have higher K values. For example, aluminum oxide (Al_2O_3) has a K of about 9 to about 10. Much higher K values of, for example, 20 or more can be obtained with various transition metal oxides, including tantalum oxide (Ta_2O_5), hafnium oxide (HfO_2) and zirconium oxide (ZrO_2).

Using a dielectric material with a higher K for the gate dielectric allows a high capacitance and an electrical equivalent thickness of a thinner silicon-dioxide (SiO2) gate dielectric layer to be achieved while maintaining or increasing the physical thickness of the gate dielectric. For example, an aluminum oxide (Al_2O_3) layer with a K of 9.6 and a physical thickness of 62.5 angstroms (Å) is substantially electrically equivalent to a silicon oxide (SiO_2) layer (K = 3.9) having a physical thickness of 25 angstroms (Å). Therefore, the gate dielectric can be made electrically thin while being formed of a physically thicker layer compared to conventional SiO_2 gate dielectric layer.

A work function of the first gate and a work function of the straddle gate are uniquely defined. The work function of the straddle gate is less than the first gate. Thus, the straddle gate FDSOI device acts like a long channel in the off state (low I_{off}) and as a short channel in the on state (high I_{on}). Therefore, the straddle gate FDSOI device results in a device with improved I_{off} while maintaining a high I_{on}. (see, for example, page 4, lines 9-14).

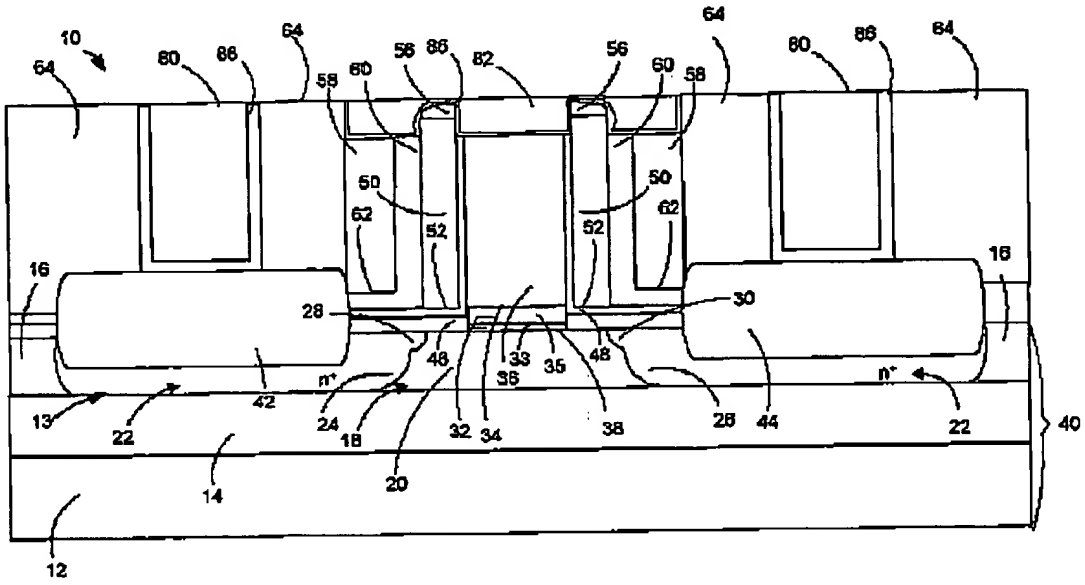

Figure 1: FIG. 1 of the Present Invention

Referring now to FIG. 4h of Lee, also reproduced below for the Examiner's convenience, Lee discloses a MOSFET having an LDD structure formed on a p-type semiconductor substrate 1. A second conduction type low density impurity regions 24 on facing sides, and adjacent to the high density source and drain regions, first gate insulation films 16 on both ends of upper part of the semiconductor substrate region between the low density impurity regions 24, a second gate insulation film 18 on the semiconductor substrate region between the ends of first gate insulation films 16, a first conduction layer 17 in a form of side wall spacer on the first gate insulation film 16, a second conduction layer 21 on the second gate insulation film 18 filling a space formed by and between the first conduction layers 17 of side wall spacers, forming a gate pole connecting the first conduction layer 17, the second conduction layer 21, and a third conduction layer 22 which is

formed on the first conduction layer 17 and the second conduction layer 21, together. An insulation film side wall spacer 25 is formed on the sides of the first conduction layer 17 and the third conduction layer 22. (see, for example, Col 4, lines 10-36).

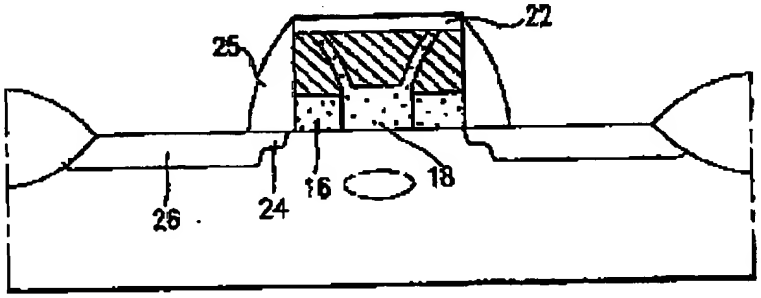

Figure 2: FIG. 4h of Lee

Lee does not disclose a dielectric layer separating the first gate and the SOI substrate, the dielectric layer having a relative **permittivity greater than SiO_2**. Lee discloses a thermal oxidation process is performed to form a second gate oxidation film 18 as a gate insulation film on the substrate area exposed by the etching of the first gate oxidation film 16 and the first conduction layers 17 (see, for example, Col 5, lines 16-20). Hwang does not make up for the deficiencies of Lee. That is, Hwang does not disclose a dielectric layer having a relative **permittivity greater than SiO_2** separating the first gate and the SOI substrate. Davis discloses silicon dioxide to have a dielectric constant on the order of 4.0 (see, for example, lines 16-17). However, Davis does not disclose a dielectric layer having a relative **permittivity greater than SiO_2** separating the first gate and the SOI substrate. Further, neither Mandelman, Tseng, Liu nor Chau alone or in combination make up for the deficiencies of Lee, Hwang or Davis.

Therefore, since the teachings of Lee, Hwang or Davis alone or in combination would not result in a dielectric layer separating the first gate and the SOI substrate, the dielectric layer having a relative **permittivity greater than SiO_2** as claimed in amended claim 1, there would be no motivation to combine the teachings of Lee, Hwang or Davis. Likewise, since Mandelman, Tseng, Liu nor Chau do not make up for the deficiencies of Lee, Hwang or Davis there would be no motivation to combine with the teachings of Lee, Hwang or Davis.

Therefore, since Lee, Hwang or Davis, alone or in combination or in combination with Mandelman, Tseng, Liu or Chau do not teach or suggest one or more of the features as claimed in amended claim 1, amended claim 1 and the claims that depend directly or indirectly from amended claim 1 are patentable over Lee, Hwang, Davis, Mandelman, Tseng, Liu or Chau for at least the reasons stated above.

II. ALLOWABLE SUBJECT MATTER

Applicants acknowledge with appreciation the Examiner's indication that claims 10-14, 24 and 25 are allowable. Allowable claims 10 and 24 have been rewritten in independent form including all the limitations of the base claim and any intervening claims. Therefore, claims 10-14, 24 and 25 are believed to be in condition for allowance.

III. NEW CLAIM

The newly added claim, i.e., claim 27, claims an additional novel and unobvious feature of the present invention. The feature of claim 27 is supported by the specification and no new matter is believed to be added (see, for example, page 4, lines 1-3 and lines 15-25 and page 8, line 19 to page 9, line 17. Therefore, claim 27 is believed to be allowable for at least the reasons stated above with regards to amended claim 1.

IV. CONCLUSION

In light of the foregoing, it is respectfully submitted that the present application is in condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present invention.

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Reply Dated July 22, 2003

Any fees resulting from this communication are hereby authorized to be charged to our Deposit Account No. 18-0988; Our Order No. 18-0988; Our Order No. AMDSPO429US).

Respectfully submitted,

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